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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/551,273	04/18/2000	Nozomu Saito	9333/237	1986

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EXAMINER

LAO, LUN S

ART UNIT	PAPER NUMBER
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2643

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DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/551,273

Applicant(s)

SAITO ET AL.

Examiner

Lun-See Lao

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,8-9,11-17 and 20-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Introduction

1 This action is response to the amendment filed on 11/04/2003. Claims 1, 8, 13 and 17 have been amended; claims 5-7 and 10, 18-19 have been canceled; claims 21-29 have been added and claims 1-29 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Romesburg (US PAT. 5,796,819).

Consider claim 13, Romesburg teaches a microphone system (see fig.5) that executes an adaptive signal processing by using output signals from two microphones (22,36) and outputs a speaker's voice signal with an improved SN ratio, wherein the microphones (22,36) are positioned close to one another, and the SN ratio of the output signal from one microphone is raised (inherent, because one microphone is closer and other microphone is farther from a speaker) while the SN ratio of the output signal from the other microphone is lowered (see col.14 line 21-col.15 line 23);

wherein a first adaptive signal processor receives an output signal from one microphone (22) and an error signal and provides an output signal to a subtracter (46, 24), a second adaptive signal processor receives an output signal from the other microphone (36) and said error signal and provides an output signal to said subtracter

(38,46), and the subtracter (46) outputs said error signal, the first and second adaptive signal processors executing adaptive signal processing to minimize the power of said error signal (see col.11 line 31-col.112 line 27).

Consider claim 14, Romesburg teaches a microphone system of one microphone (see fig.5, 22) is disposed almost directly above the face of a speaker (4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 8-9, 11-12, 21-23, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as applied to claim 1 in view of Walters (US PAT. 5,442,813).

Consider claim 1, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a sound signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the microphone system comprising two microphones (11,21) having directional characteristics, wherein the microphones are positioned relatively close to one another, and the angles (see fig.6) formed by the orientations of the microphones with respect to a sound signal direction are different for each of the microphones (see col.6 lines 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice. Placing the microphones in front of and above the position of the speaker's mouth by approximately the same distance would have been obvious for the operation of Sasaki.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach that the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° , and that the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 45° .

Walters teaches the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° (speaker's mouth faces the microphone, fig.3). As to the orientation of another microphone to form an angle of approximately 45° with respect to the speaker's vocalizing direction, the microphones of Walters (2, 3, 4) are mounted on the supporting rod 8 (see fig.s 2, 8). As the sun visor is rotated upwards and downwards on the hinge, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the passenger/speaker (represented by direction 9) (fig.s 3 and 4 and denoting text). Obviously, 45° would have been formed during such rotations.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Walters to provide the supporting member traverses an angular range, within which the main reception

direction of the microphones intersects the sun visor, with a snap-type movement during pivoting of the sun visor.

Consider claims 2, 9, 23 and 27 Sasaki fails to disclose a microphone is mounted on the sun visor of a vehicle.

However, Walters teaches a microphone is mounted on the sun visor of a vehicle (see col.4 lines 6-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Walters to provide the microphone arranged close to the narrow side of the sun visor facing away from the speaker/listener at only a very small distance from the sun visor.

Consider claim 8, Sasaki teaches a microphone system comprising two microphones having directional characteristics (see fig.3), an adaptive filter (see fig.2 (24)) that simulates a noise signal outputted from one microphone (21) by using a noise signal outputted from the other microphone (11), and a calculation means (see col.3 line 11-col.4 line 65) that calculates a difference between these two noise signals, wherein the two microphones (11,21) are positioned substantially adjacently, and angles (see fig.6) formed by the orientations of the microphones with respect to a speaker's vocalizing direction are different for each of the microphones (see col.6 line 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice. Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach the two microphones spaced apart approximately 9 cm and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° , and the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 60° .

However, Walter teaches two microphones spaced apart approximately 9 cm (see fig.2 (2,3,4,)); and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° (when the speaker's mouth face to the microphone (see fig.3)), and the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 60° (by adjusted sun visor (see fig.4, (8))).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Walters to provide the supporting member traverses an angular range, within which the main reception direction of the microphones intersects the sun visor, with a snap-type movement during pivoting of the sun visor.

Consider claims 11-12, Sasaki teaches a microphone system of further comprising a filter processing means that updates inherently (such as changing the tap) filter coefficients (weight vector) of the adaptive filter (see col.9 line 50-col.10 line 15); and the filter processing means receives a voice signal outputted from a microphone and a difference signal outputted from the calculation means, and updates inherently (such as changing the tap) the filter coefficients of the adaptive filter so as to minimize a power of the difference signal by using the LMS algorithm (see col.9 line 50-col.10 line 15).

Consider claim 21 Walters teaches a microphone system of the distance between the two microphones is about 9 cm (see fig.2, (2,3,4) and col.4 lines 24-42).

Consider claim 22, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two directional microphones (11,21) (see col.6 lines 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction and are spaced apart approximately 7.5 cm.

However, Walter teaches the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction; the microphones of Walters (2, 3, 4) are mounted on the supporting rod 8 (see fig.s 2, 8). As the sun visor is rotated upwards and downwards on the hinge, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the passenger/speaker (represented by direction 9) (fig.s 3 and 4 and denoting text). Obviously, substantially perpendicularly to the speaker's vocalizing direction would have been formed during such rotations and

the microphones are spaced apart approximately 7.5cm (see fig.2 (2,3,4) and col.4 lines 24-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Walters to provide the supporting member traverses an angular range, within which the main reception direction of the microphones intersects the sun visor, with a snap-type movement during pivoting of the sun visor.

6. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) as applied to claim 13 in view of Lange (EP 457,176).

Consider claims 15-16, Romesburg fails to teach a microphone system of the other microphone is spaced apart on the occipital side from the position of the one microphone; and a microphone system of the other microphone is spaced apart on the occipital side by about 1 to 5 cm from the position of the one microphone.

However, Lange teaches a microphone system wherein the other microphone is spaced apart on the occipital side (see fig.1 (1b)) from the position of the one microphone (1a); and a microphone system of the other microphone is spaced apart on the occipital side (see fig.1 (1b) from the back seat) by about 1 to 5 cm from the position of the one microphone (1a from back of the car).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg with Lange to provide the microphone apparatus having better noise cancellation.

Consider claim 17, Romesburg teaches an in vehicle microphone system comprising two microphones (see figs.8,9 (22,36)) positioned inherently at a height above a speaker's mouth, an adaptive filter (see figs. 3-7, (42,14,40,32)) that simulates

a noise signal outputted from one microphone by using a noise signal outputted from the other microphone, and a calculation means (see col.10 line 10-60) that calculates a difference between these two noise signals, wherein one microphone (22) is disposed substantially directly above the face of a speaker (see col.10 line 10-60).

Romesbury does not teach the other microphone is spaced apart on the occipital side by about 1 to 5 cm from the position of the one microphone.

However, Lange teaches a microphone system, wherein the other microphone is spaced apart on the occipital side (see fig.1 (1b) from the back seat) by about 1 to 5 cm from the position of the one microphone (1a from back of the car).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg with Lange to provide the microphone apparatus having better noise cancellation.

7. Claims 3-4, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Walters (US PAT. 5,442,813) as applied to claim 1 above, and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 3-4, 24-25 Sasaki and Walters fail to teach a microphone system of the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system, wherein the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Walters into the teaching of Romesburg to provide the microphone apparatus having better direction sound.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) as modified by Lange (EP 457,176) as applied to claim 17 above, and further in view of Yoshida (US PAT. 5,473,702).

Consider claim 20, Romesburg and Lange fail to teach that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter.

However, Yoshida teaches that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients (such as control signal ck) during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter (col.8 line 30-col.9 line 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg and Lange into the teaching of Yoshida to provide an echo canceller to enable a noise canceller to adapt automatically to changes in background noise level.

9. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538).

Consider claim 26, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two directional microphones (11,21); wherein one microphone is oriented substantially perpendicularly to the speaker's vocalizing direction, the other microphone is oriented at an acute angle relative to the orientation of the one microphone (see figs.3,6-7 and col.6 lines 13-28), and the microphones are spaced apart by about 2 cm (see fig.8, d and col.6 line 48-col.7 line 49 and claim1 (first microphone and second microphone are adjacent to each other)).

While Sasaki does not explicitly teach that the speaker's voice signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

10. Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Romesburg (US PAT. 5,796,819).

Consider claims 28-29, Sasaki and Walters fail to teach a microphone system of the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system of the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and

the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki into the teaching of Romesburg to provide the microphone apparatus having better direction sound.

Response to Arguments

11. Applicant's arguments filed 11/4/2003 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the amended configurations of approximately same distance in front of and above the position of the speaker's mouth (claim 1), two microphones approximately 9 cm apart (claim 8), two microphones 1 to 5 cm apart (claim 17), these are met by Walters in that the microphones 2, 3, 4 are attached to and spaced along the supporting member 8 of the sun visor of a vehicle. One of ordinary skill in the art would recognize, from the size of a typical supporting member of a sun visor, the distances of 1 to 5 cm or 9 cm between microphones would be obvious choices. Regarding the angles of 0, 45 and 60 degrees as recited in claims 1 and 8, these are also met by Walters in that as the sun visor is rotated upwards, downwards or sideways with the supporting member, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the passenger/speaker (represented by direction 9) (figures 3 and 4 and denoting text). Obviously, 0°, 45°, 60° would be formed during such rotations.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259. The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

Art Unit: 2643

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao, Lun-See
Patent Examiner
US Patent and Trademark Office
Crystal Park 2
(703305-2259)


DUC NGUYEN
PRIMARY EXAMINER